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Mind-Reading in Social Interaction:
A Parsimonious Mediating Formula for a Popular Magic

Linh L. Phan

Free University of Amsterdam

Research Master Program in Social Psychology

Correspondence address: Linh L. Phan, Free University of Amsterdam, Van der
Boechorstraat 1, 1011 RL Amsterdam, The Netherlands (linhlan.phan@gmail.com)

Abstract

Mind-reading, the ability to know what other people think, feel, and intend, is a magic that everyone can do. The simulation theory states that mind-reading ability develops through and receives input from social interaction. During the course of interaction, by perceiving and analysing the other persons' behaviours and contextual cues, we can understand other people's mental states and infer meanings to their behaviours. Several neurological studies provide substantial supports to the simulation theory. I also suggest that there are three factors mediating between interaction and mind-reading ability: experience repertoire, culture and familiarity.

Mind-Reading in Social Interaction: A Parsimonious Mediating Formula for a Popular Magic

‘... The Dark lord is highly skilled at Legilimency.’

‘What’s that? *Sir?*’

‘It is the ability to extract feelings and memories from another person’s mind.’

‘So he can read minds?’ said Harry quickly...

... ‘Only Muggles talk of “mind-reading”. The mind is not a book, to be opened at will and examined at leisure. Thoughts are not etched on the side of skulls, to be perused by any invader. The mind is a complex and many-layered thing, Potter – or at least, most minds are.’ He smirked. ‘It is true, however, that those who have mastered Legilimency are able, under certain conditions, to delve into the minds of their victims and to interpret their findings correctly. The Dark Lord, for instance, always knows when somebody is lying to him...’

... ‘So he could know what we’re thinking right now? *Sir?*’

‘The Dark Lord is at a considerable distance...’ said Snape. ‘Time and space matter in magic, Potter. Eye contact is often essential to Legilimency.’...

Harry Potter and the Order of the Phoenix – J. K. Rowling

Reading other people’s mind is not a “Legilimency” spell, feasible only to the Dark Lord and Harry Potter! Everyone among us has cast this kind of magic not less than several times every day, and even without waving a wand or reading from an ancient Runes parchment. You may wonder; how can we do it? It is true that mind-reading is facilitated by eye contact and conversation with the other person, or to be exact, by social interaction. In this paper, I will discuss the importance of social interaction in mind-reading, and support the idea with evidence from some neuro-scientific research. Moreover, I will go beyond the existing accounts by proposing a parsimonious mediating model between social interaction and mind-reading ability.

Mind-reading - the ability to know what other people think, feel, and intend - is also referred to by the term “mental state inferences”, or the ability to judge and recognize other’s unstated emotions and opinions (Ames 2004). Both psychologists and neurologists have been looking for the mechanisms of mind-reading ability with different approaches. In social psychology, the simulation theory of mind-reading stated that to infer mental states to another person, one first has to simulate, replicate, or recreate in his own mind the same state of the other (Vogeley et al. 2001). By imitating the other’s expressions, one can feed similar mental states into one’s own cognitive systems, and infer equivalent meanings and ‘contents’ to the other’s mind. This theory concurs with the idea that mind-reading ability and phenomena rely

on interaction hints and situational clues. In other words, the ‘ingredients’ we use to make up the mind-reading spell is simply a frown, a glance, a smile, or a shrug of the other person during the course of interaction.

There are also structural approaches to the mechanism of mind-reading. For example, Coricelli (2004) suggested that there are two levels of mind-reading: the first level contains primitive mind-reading activities, such as imitation and action-emotion recognition. The second level of mind-reading employs the ‘cold’ cognition’, involving abstract cognitive processes such as association, imagination, reasoning and decision making. While most of these activities are automatic and unconscious, the second level of mind-reading is voluntary and intentional.

So far, simulation theory has received substantial supports from some neuro-scientific studies, which will be presented briefly below. These studies in neuroscience also assume to find the location of activities in the first level of mind-reading. Yet, most activities described as the second level of mind-reading, just as other high cognitive processes, are still lying beyond the reach of neuroscience.

Supports from neuroscience to the link social interaction – mind-reading

Neuroscientists’ efforts are focused on how and where mind-reading activities occur in the brain, by exploring and comparing activated areas of the brain during different psychological activities. Several years ago, Gallese and Goldman (1998) published their discovery of mirror neurons, supporting the simulation theory of mind-reading. Their experiment on macaque monkeys concludes that a cortical system consisting of mirror neurons can be activated both when the subject performed a particular action and when the same action is observed in another monkey. This activity of the brain can be considered as neural imitation of the observed mental states, a preliminary step of empathy and mind-

reading. By imitating the neural activation and thus, recreating the very same mental state, the subject can recognize mental states of conspecifics.

A study by Jackson, Meltzoff, and Decety (2005) also promotes the same idea. In the 'exposed' group, adult participants were asked to examine and rate the level of pain in a series of photographs. In comparison to the control group, who examined neutral photographs, fMRI scans of the exposed group reveal overlapping neural activities between perceiving and experiencing pain in the cerebral area. It can be speculated that the same type of mirror neurons in monkeys have developed into systems of empathy in the human brain. Preliminary perception of the observed or perceived mental states starts with reflecting activation of the brain, by using cues picked up from social interaction.

Yet, when the brain has perceived the mental states of the observed other, this information must be associated with equivalent meanings. This step of transference to cognition requires a reflection on one's own experience repertoire. In the study by Vogeley et al. (2001), participants in the 'self' condition were requested to assess their own beliefs, emotion or knowledge by filling in the sentences "I know, believe, etc." Participants in the mind-reading condition assessed other persons' mind by filling in the sentences "Person A knows, believes, etc." The two activities result in mainly different areas of brain activation, but there is also a significant overlapping area in the right prefrontal cortex during both activities. This can be considered as evidence that information from mind-reading and self-reflecting activities are both transferred and integrated in this brain area. In other words, the information from social interaction and situational cues must be combined with assessment of one's own corresponding mental states to yield the understanding of the other's mind.

A parsimonious mediating model of social interaction and mind-reading

Mind-reading, in simulation theories, is like bi-lingual translation. One must compare other's behaviours with one's own, and interpret them by matching equivalent meanings to

each behaviour, such as thoughts, emotions, intention, and personality traits. I suggest that several factors mediate between interaction and mind-reading: one's own experience repertoire, cultural influence, and familiarity. These factors will be discussed below.

First of all, experience repertoire is the coding system, or a mental dictionary, that allows this 'bi-lingual translation'. It is a list of verbal and non-verbal expressions, actions, or inactions, a single behaviour or a series of reactions. In order to infer mental states to other people, one must first be aware of one's own mental states, their possible causes, behavioural and physical expressions, and then adopt the mental states of the other based on their expressions and behaviours. I believe that experience repertoire and the capability to recognize one's own thoughts, feelings, emotions, and attitudes develop simultaneously and interactively with the ability to infer mental states to other people. Knowing oneself and "translating" others' mind both contributed to social competence.

Experience repertoire is acquired gradually through practicing social interaction. A series of studies by Meltzoff (1999) suggested that from the very first few days of social life, newborns learn to react to interaction by simply imitating others' behaviours. At 26 to 30 weeks age, they start to develop a relation between vocal imitation and facial expressions. By listening to a tape of one vowel for 5 minutes a day for 3 consecutive days, newborns at this age can recognize and pay more attention to facial pictures that match the same vowels on the tape. Later in life, imitation develops into the ability of interpreting interaction and situational cues. Children around two-years old start to understand that other people can have different knowledge, intention, and world perspective than their own. The ability to understand other people' minds does not start with constructing a fully developed theory of mind, but rather develop from interpreting situational cues. For example, in the studies by Dunham, Dunham and O'Keefe (2000), after several times observing the mother covered their eyes while a toy was hidden, the child learned to understand that she did not know the hidden place of the toy,

and the child employed more pointing gestures to ‘help’ her find the toy. Thus, by observing and participating in a situation, the child enlarges her own experience repertoire, while also improves her understanding of other persons’ behaviours and contextual cues. As one’s interaction network expands through life, her experience repertoire is enriched

Experience repertoire also develops under the influence of language. According to Semin (1997), abstraction level of language, especially verbs, is applied systematically to drawn inferences about the other persons, such as stereotypes and power distance. As the ability of abstract language increases, the understanding of social categorization and stereotyping is also refined. The meaning of interaction cues can be transferred more easily to a full theory of mind when abstract words referring to thoughts, intentions or emotions are learned and decoded. Mind-reading ability develops with the scope of one’s cognitive ability and social interaction.

The second factor influencing mind-reading is culture. Most interaction cues, especially non-verbal actions are ‘ambivalent’, and might be interpreted differently across cultures. Each culture decodes it by choosing a different particular meaning. The debate over the relation between expressions and culture is still going on hotly. For example, the dyadic relationship between the face and the mind is more complicated than just a bi-lingual dictionary. Doi (1985) describes a Japanese illustration as a contrast to American culture: *omote* means “face” and *ura* means “mind”; *omote* is expressions and *ura* is the personality. *Omote* reveals *ura*, and at the same time conceals it. The face is a word, and the mind includes layers of meanings behind it. The face is what the person wants to communicate, and it can be very far from the real thought, feeling or intention hidden behind the face. However, his argument does not exclude the idea that expressions are hints for social categorization and stereotype judgements, from which inference to other people’s mind is drawn. For example, Baron-Cohen et al. (1996) insists that mental states, not only emotions but also intentions and

cognitive activities, such as *seeking revenge* and *recognition*, can be inferred from facial expressions across cultures. In his experiment, adults and children from Britain, Spain, and Japan seemed to show significant consensus judgement on the expressions of portraits by one contemporary British artist and one seventeenth-century Spanish artist. This is evidence that certain basic codes of expressions remain stable meaning-wise across cultures.

The last factor mediating between interaction and mind reading, the degree of familiarity in the particular relationship, has the opposite effect to culture. While culture may alter or vary the meanings of expressions, familiarity between the two persons refines and stabilizes this coding list. Thomas and Fletcher (2003) show evidence that mind-reading accuracy depends on relationship satisfaction and duration. While relationship satisfaction does not influence empathy accuracy in short relationships, it strongly increases mind-reading accuracy in longer relationships. Interdependence Theory Principles by Kelley and Thibaut (1959, in Beerscheid and Regan 2004) suggests that individuals adjust their behaviours to their partners in order to maintain relationship satisfaction and increase unity between partners. Over long-term interaction, these adaptations become stable behavioural tendencies. It is noted that this unity between partners in terms of corresponding behavioural strategies and shared knowledge, not merely the duration of relationship, directly influenced mind-reading accuracy between partners.

Discussion

Simulation theory suggests that mind-reading ability relies on interaction in terms of input information, practice and cognitive resources. When the observer picks up cues from interaction (the other person's expressions and contextual cues), related brain areas to the real experience are activated, which recreates a similar mental state as in the performer. This information is synthesized by higher cognitive processes to infer meaningful mental states to the other person. Up to now, most of the mechanisms that connect between interaction and

mind-reading remain unexplored. Besides experience repertoire, cultural influence, and familiarity, there may be other factors mediating between interaction and mind-reading, such as stereotypes, personality traits, etc. However, the scope of this paper only allows an introduction of a parsimonious model (figure 1). The topic also deserves more examination from other perspectives. For example, developmental psychology might consider whether mind-reading ability also degrades under the influence of senility as other cognitive functions, or simply alters through the course of life, with the increasing wisdom and experience.

Last but not least, the theoretical link between social interaction and mind-reading is clearly supported by some studies in neuroscience. Yet, it is still a question whether seeking neurological evidence for psychological theories is a good strategy. While social psychology explores the mechanism of mind-reading by examining basic processes of the mind, the neurologists aims at answering the same questions by examining the activities of the brain. Yet, both approaches apply the empirical method. The efforts to combine and synthesize findings from these two fields of study have always been challenged by a philosophical question concerning the relationship between the mind and the body. Descartes believed that the brain functions as a switching system between the body and the soul, regulating our actions, thought and feelings. Is it so? Can science always explain all mental processes in terms of machinery? Does brain activation overlap during two different psychological processes means an integration of these two processes? Is it possible to consider results of neurological studies as the answer the psychological questions? As the ending of a science-fiction movie series, the answer is said to come in a later episode.

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Figure 1: A Simple Model of the Relation between Social Interaction and Mind-Reading Ability.

